

REMARKS

Support for the above amendments to Claims 1, 4 and 11 can be found in the specification on page 7, lines 27-29. This amendment serves to clarify the claim language and remove the language which the Examiner apparently believes is confusing.

Claims 1-5 and 11-15 were rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicants regard as their invention.

Applicants respectfully submit that this rejection is moot in view of the preceding amendments to Claims 1, 4 and 11.

Claims 1-3, 5 and 11-15 were rejected under 35 U.S.C. 103(a) as being unpatentable over the Woerner et al reference (U.S. Patent 3,903,126).

The Woerner et al reference (U.S. Patent 3,903,126) discloses biuret group containing polyisocyanates. The biuret group containing polyisocyanates in the Woerner et al reference comprise the reaction product of aliphatic and/or cycloaliphatic diamines with polyisocyanates. These components are reacted in proportions to give an NH_2 to NCO ratio of from 1:3 to 1:100.

Applicants request clarification of the rejection. It was stated by the Examiner on page 3 of the May 15, 2005 Office Action that a new ground of rejection is being made, and the new ground of rejection is under 35 U.S.C. 103(a), and specifically states that Claims 1-2, 5 and 11-15 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 3,903,126 (the Woerner et al reference). On page 4, last paragraph of the Examiner's comments under this rejection, it was stated that "[T]he foregoing anticipates the rejected claims within the meaning of section 102."

Thus, it is unclear whether this rejection is obviousness under 35 U.S.C. 103(a) or anticipation under 35 U.S.C. 102(b).

For purposes of this amendment and response, Applicants have assumed that the anticipation rejection under 35 U.S.C. § 102(b) has been withdrawn, and that the intended and/or proper rejection to be addressed is obviousness under 35 U.S.C. § 103(a). If this is incorrect, it is respectfully requested that Applicants be advised and provided additional time in which to respond.

It is Applicants' position that the Woerner et al reference does not render the presently claimed invention obvious to one of ordinary skill of the art.

Biuret group containing polyisocyanates are described by the Woerner et al reference. These may be prepared from various polyisocyanates including toluene diisocyanate. It is evident that the amine group containing compound used to prepare these biuret group containing polyisocyanates of the Woerner et al reference is a diamine. As previously stated, the present invention requires a secondary monoamine to be reacted with the toluene diisocyanate. Thus, the invention disclosed and claimed by the Woerner et al reference does not render the presently claimed invention obvious to one of ordinary skill in the art.

The Examiner states that "...the use of monoamines is contemplated by the reference, see column 1, line 24, and is therefore within the motivation of those of ordinary skill in the art". See page 4 of the May 15, 2006 Office Action, 3rd paragraph, last line therein.

Applicants respectfully submit that it should be noted that the paragraph at column 1, lines 18-32 summarizes "proposals" for biuretizing isocyanates, and specifically discloses the use of amines to introduce elements other than diisocyanate elements into the biuret-group containing polyisocyanate. It further refers to the "relevant literature" which stresses that only very specific amines whose reactivity to isocyanates is reduced by steric or electronic influences, can be reacted with diisocyanates in a controllable reaction. Secondary monoamines are disclosed in this list of specific amines. However, the Woerner et al reference broadly refers to the "relevant literature" and does not provide specific literature references or any

details of these "literature references". Thus, it is unclear to Applicants whether such literature references actually exist, and if so, if these references actually disclose or suggest the presently claimed invention in a manner that it is obvious to one of ordinary skill in the art.

The only reference specifically disclosed in the background of the Woerner et al reference is German Published Application 1,568,017. This reference is described by Woerner et al as disclosing biuret group-containing polyisocyanates which are obtained directly from aromatic diamines and diisocyanates, with the reaction carried out in solvents boiling at a temperature below the boiling point of the isocyanate.

Applicants have reviewed the other references cited in U.S. 3,903,126, i.e. U.S. Patents 3,441,588 and 3,462,470 for relevance to the presently claimed invention. U.S. Patent 3,441,588 discloses polyether polyisocyanato biurets, and U.S. Patent 3,462,470 discloses liquid polyisocyanate compositions and a process for the manufacture of these liquid compositions. The '588 patent discloses polyether polyisocyanates which have biuret groups and are produced from ω,ω' -diamino polyethers and diisocyanates. Applicants respectfully submit that this reference is clearly no more relevant than the Woerner et al reference to the presently claimed invention as it is clearly directed to biurets prepared from diamines. By comparison, the present invention requires a secondary monoamine group containing compound.

The liquid polyisocyanate compositions of U.S. 3,462,470 are described as not undergoing a rapid increase in viscosity and not depositing solids masses upon storage (see column 1, line 71 through column 2, line 2). These liquid polyisocyanates are prepared by treating toluene diisocyanate mixtures with small amounts, e.g. from 0.5 to 8.5% by weight, of an aromatic diamine, at a temperature of 150 to 200°C for 1 to 5 hours. It is therefore submitted that this reference is also no more pertinent to the patentability of the presently claimed invention than the Woerner et al reference.

It is Applicants' position that the statement in the background section of the Woerner et al reference concerning secondary monoamines is so broad that it is inconclusive at best, and does not fairly suggest the presently claimed invention to

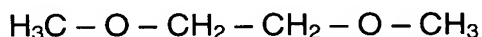
one of ordinary skill in the art. The only other information provided in the Woerner et al reference concerning biurets prepared from monoamines is at column 1, lines 29-43. This describes reacting monoamines with diisocyanates with the elimination of the monoisocyanate corresponding to the monoamine. It further states that this process suffers from a relatively slow reaction rate (and specifically mentions hexamethylene diisocyanate and water) and the formation of by-products (i.e. insoluble polyureas) which are complicated and expensive to remove. Again, no specific literature reference or patent number is provided by Woerner et al. It is respectfully submitted that at best, the information disclosed leads the skilled artisan to conclude that the reaction of monoamines and hexamethylene diisocyanate to form biurets is slow and cumbersome. This information does not fairly suggest the presently claimed invention to one of ordinary skill in the art.

The present invention is clearly directed to a stable liquid biuret modified toluene diisocyanate. In the context of the present invention, the term "liquid" means the product does not precipitate solids when stored at 25°C for 3 months, and "stable" means that the product has up to a 1% absolute change in the NCO group content and up to a 10% change in the viscosity when stored at 25°C for 3 months. See page 20, line 28 through page 11, line 1 of the present specification. Based on the information at column 1, lines 20-43 of the Woerner reference, one of ordinary skill in the art could not reasonably expect to be able prepare stable liquid biuret modified toluene diisocyanates as required by the present claims.

Applicants respectfully submit that there is no evidence of record that either the biurets prepared from the diamines and the polyisocyanates as claimed in the Woerner et al reference, or the "proposed" biurets which are broadly referred to by Woerner et al from secondary monoamines and diisocyanates, are both stable and liquid as defined herein and required by the presently claimed invention. Accordingly, an "obvious to try" standard of patentability is being applied to the present invention, and this is clearly improper. Applicants therefore submit that the Woerner et al reference does not render the presently claimed invention *prima facie* obvious under 35 U.S.C. § 103(a). Accordingly, this rejection is improper and it is requested that it be withdrawn.

Furthermore, with regard to the rejection of Claims 11-15 as being unpatentable under 35 U.S.C. 103(a) over the Woerner et al reference, Applicants respectfully submit that there is no basis for this rejection.

Although this reference discloses inert diluents at column 3, lines 59-67, including, for example, ethyl acetate, ethyl glycol acetate, benzene, toluene, diisopropyl ether, dibutyl ether, ethylene glycol dimethyl ether, etc., none of the disclosed compounds are aromatic alcohols or aliphatic alcohols, i.e. component (c), as required by Claim 11 of the present application. Ethyl glycol is **not** disclosed by the Woerner et al reference as stated by the Examiner. See page 4 of the May 15, 2005 Office Action, 3rd full paragraph. In addition, Applicants are not aware of a chemical compound corresponding to the name "ethyl glycol". Applicants searched the Registry File of CAS On-Line and "ethyl glycol" is not listed. Thus, it appears that the Examiner has confused this with ethyl alcohol or with ethylene glycol. However, neither ethyl alcohol or ethylene glycol are disclosed by this reference. In addition, it is Applicants' belief that the closest name of the diluents set forth by the Woerner et al reference is ethylene glycol dimethyl ether. This compound corresponds to the chemical formula:



Applicants respectfully submit that it is readily apparent to one of ordinary skill in the art that ethylene glycol dimethyl ether contains two ether groups, and no hydroxyl groups. Therefore, this is not an aliphatic alcohol or an aromatic alcohol as required by component (c) of Claim 11. Thus, it is respectfully submitted that the Woerner et al reference does not properly render the invention of Claims 11-15 *prima facie* obvious to one of ordinary skill in the art. Applicants therefore request that this rejection be withdrawn as it is clearly improper.

Claims 1-5 were also rejected under 35 U.S.C. 103(a) as being obvious over the JP 62256893 patent (the Koizumi et al reference).

JP 62256893 discloses thickeners for lubricating greases. The thickeners therein contain the reaction products of (a) a monoamine of the specified formula, (b)

a diisocyanate compound of the specified formula, and (c) a diamine of the specified formula. The formula of the monoamine (a) is R_1NH_2 in which R_1 is an unsaturated or saturated C6-20 alkyl or C6-10 aryl. The diisocyanate (b) corresponds to the formula $OCNR_2NCO$ in which R_2 is a divalent C6-20 aryl. The formula of the diamine (c) is $H_2NR_3NH_2$ in which R_3 is a divalent C2-12 alkylene or a C6-15 aryl.

In particular, the thickener may be the reaction product of 1.0 mol oleyl amine, 0.93 mol of a mixture of 2,4- and 2,6-toluene diisocyanate, and 0.44 mol ethylenediamine. The resulting thickener is added in an amount of from 2 to 30 wt.% to a mineral base oil to form a lubricating grease having a dropping point of 262° vs. 178° for a conventional thickener.

Applicants respectfully submit that the presently claimed invention is not obvious in view of the JP 62256893 patent. As set forth above, the stable liquid biuret modified toluene diisocyanates of the present invention comprise the reaction product of a secondary monoamine compound and toluene diisocyanate.

The thickener compound of the JP 62256893 patent comprises the reaction product of (a) a monoamine compound of the formula R_1NH_2 , (b) a diisocyanate compound of the formula $OCNR_2NCO$, and (c) a diamine compound of the formula $H_2NR_3NH_2$. (The formulas as shown in the abstract have been altered to reflect the subscripts of each formula. This does not alter the meaning as would be understood by one skilled in the art reading the abstract of the JP'893 patent.) It is evident from the formulas provided that the thickeners produced in this reference are the reaction product of (a) a primary monoamine, (b) a diisocyanate, and (c) a diamine. In the diamine, both amine groups are also primary amine groups. Thus, the JP 62256893 patent does not disclose or suggest reacting a secondary monoamine group containing compound with an isocyanate such as toluene diisocyanate as required by the presently claimed invention.

It is respectfully submitted that the JP 62256893 reference does not suggest reacting a secondary monoamine with the toluene diisocyanate. Thus, this reference does not establish a *prima facie* case of obviousness.

One of ordinary skill in the art has no basis to modify this reference in the manner necessary, even when combining the JP 62256893 reference with the

Woerner et al reference, to "arrive at" the presently claimed invention. As previously discussed, the Woerner et al reference only discloses and suggests that biurets can be prepared from diamines and diisocyanates. The skilled artisan would not reasonably expect the substitution of a secondary monoamine as discussed in the background of the Woerner et al reference for the primary monoamine in the JP reference to be successful for the reasons as discussed above. Thus, this substitution would not be made.

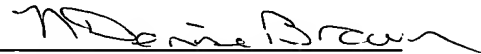
Furthermore, this substitution would not result in the presently claimed biurets. As previously stated, the JP 62256893 reference discloses reacting both a primary monoamine and a diamine with a diisocyanate. One would not be motivated to omit the diamine component as it is required by both the JP reference and the Woerner et al reference. Thus, this combination of references would not be altered in the necessary manner to "arrive at" Applicants' invention.

Only after reading Applicants' specification does it become "obvious" to prepare a stable liquid biuret by reacting a secondary monoamine with toluene diisocyanate. Such a perspective does not, however, provide a proper basis for a rejection under 35 U.S.C. § 103.

Accordingly, Applicants respectfully submit that the presently claimed invention is not properly rejected as being obvious under 35 U.S.C. 103(a) over the JP 62256893 patent either alone, or in combination with the Woerner et al reference. It is requested that this rejection be withdrawn.

In view of the preceding amendments and remarks, it is evident that these rejections are in error and should be withdrawn. The allowance of Claims 1-5 and 11-15 is respectfully requested.

Respectfully submitted,

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